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(56) Documents Cited  
GB 2064265 A GB 1363550 A EP 0161735 A2  
WO 98/20660 A1 DE 004107371 A1 US 4263484 A

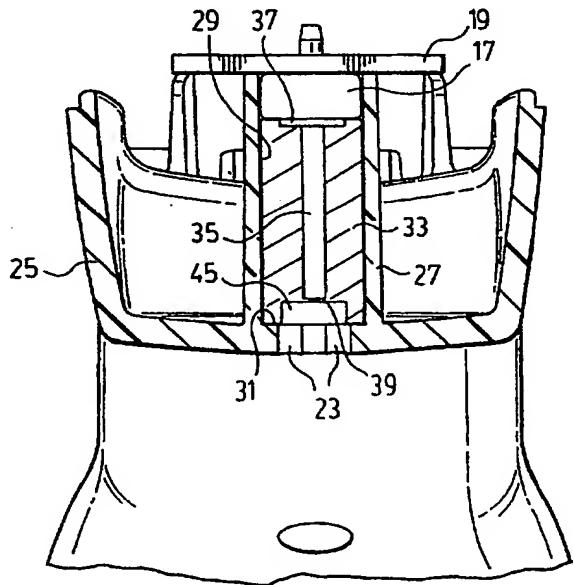
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(54) Abstract Title

Unitary gasket provides complex acoustic path for bringing sound to a microphone

(57) The path includes a pre-plenum chamber 45 and apertures 23 to allow external sound into the pre-plenum chamber. The path further includes an acoustic filter 39 communicating with the pre-plenum chamber and defining relatively small openings for sound to exit the pre-plenum chamber. A voice tube 35 extends from the acoustic filter to a microphone plenum chamber 37, the latter being in direct communication with the microphone 17.

FIG.2.



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FIG.1.(PRIOR ART)

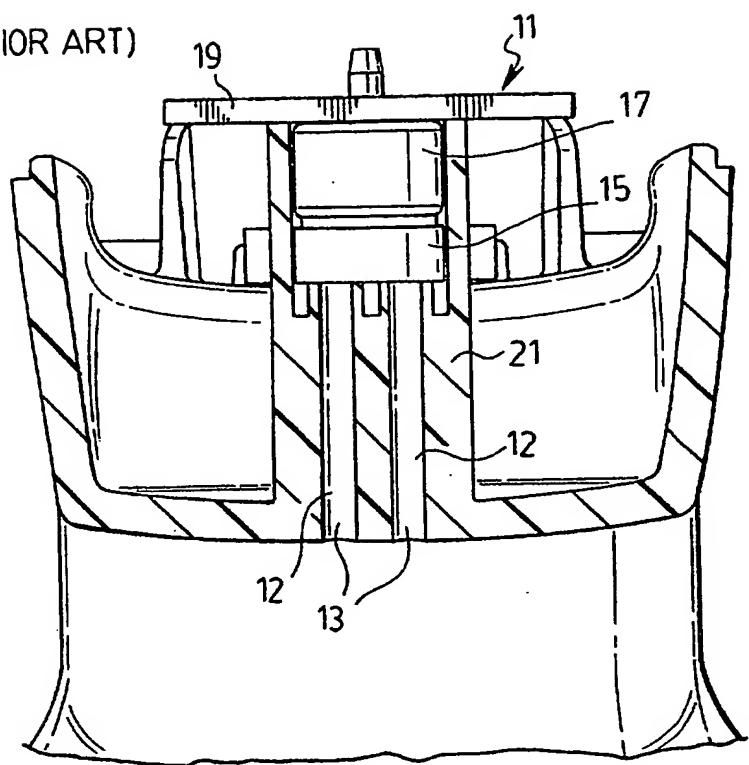


FIG.2.

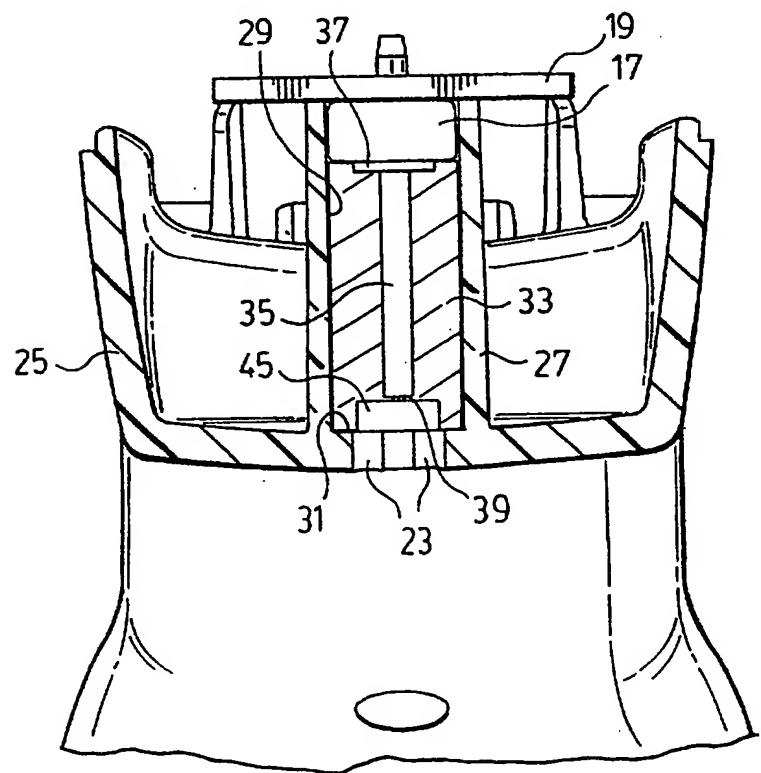


FIG. 3.

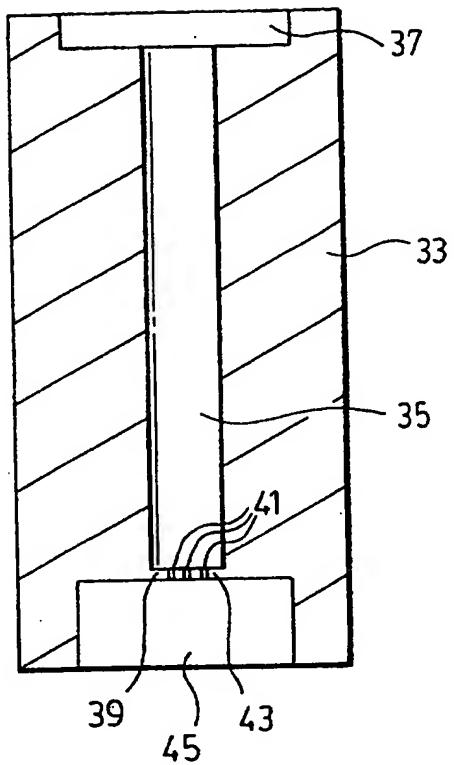


FIG. 4.

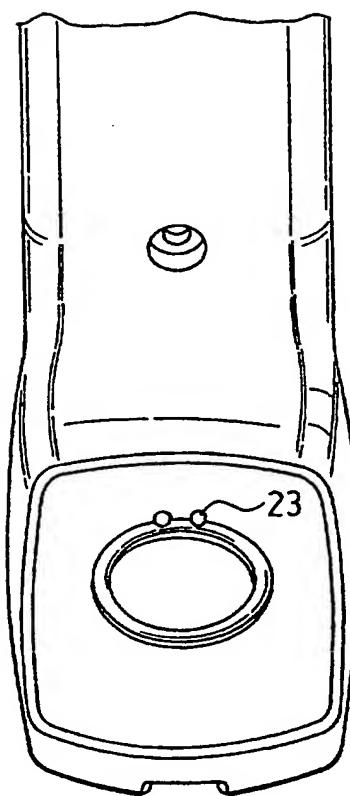


FIG. 5.

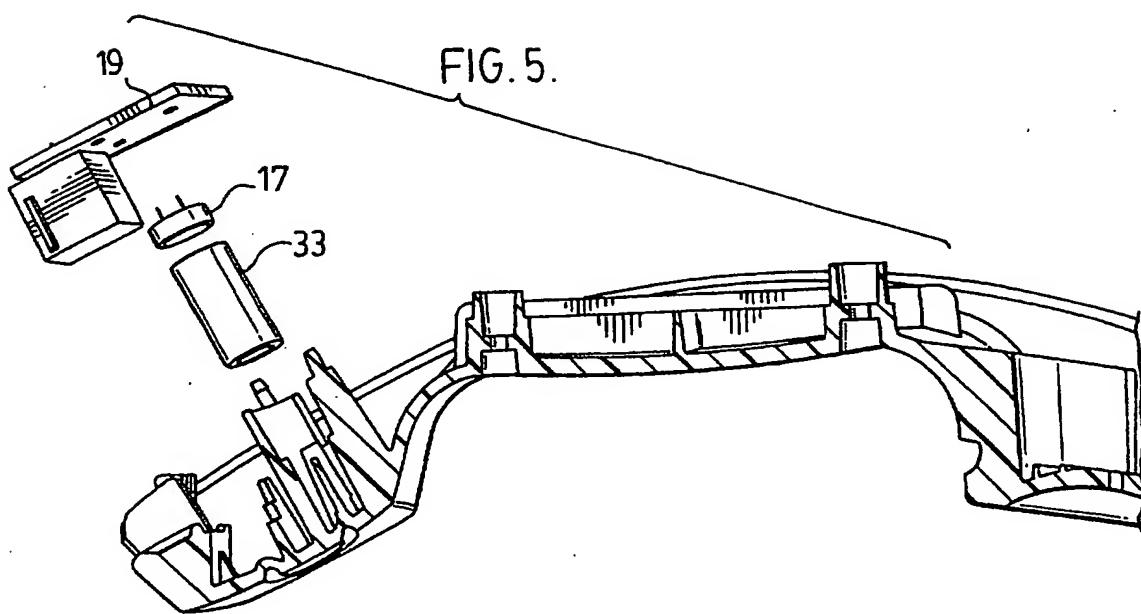


FIG. 6.

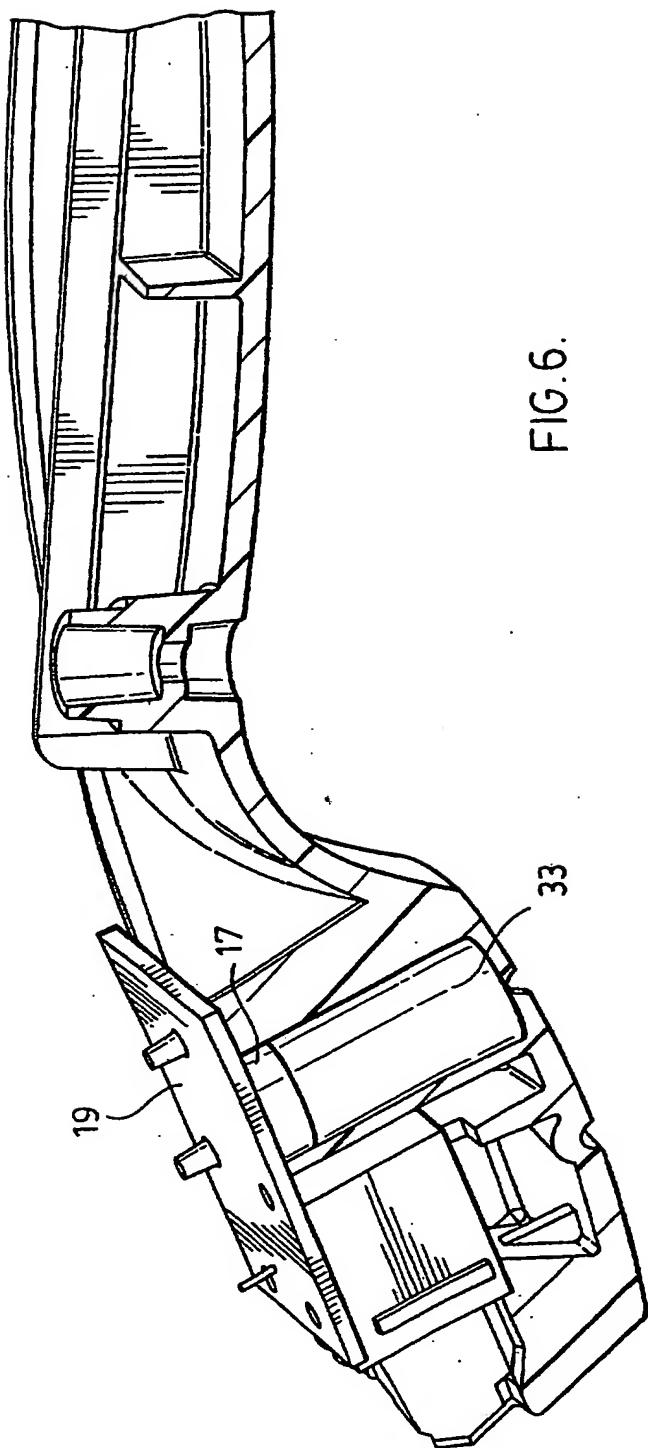


FIG. 7.

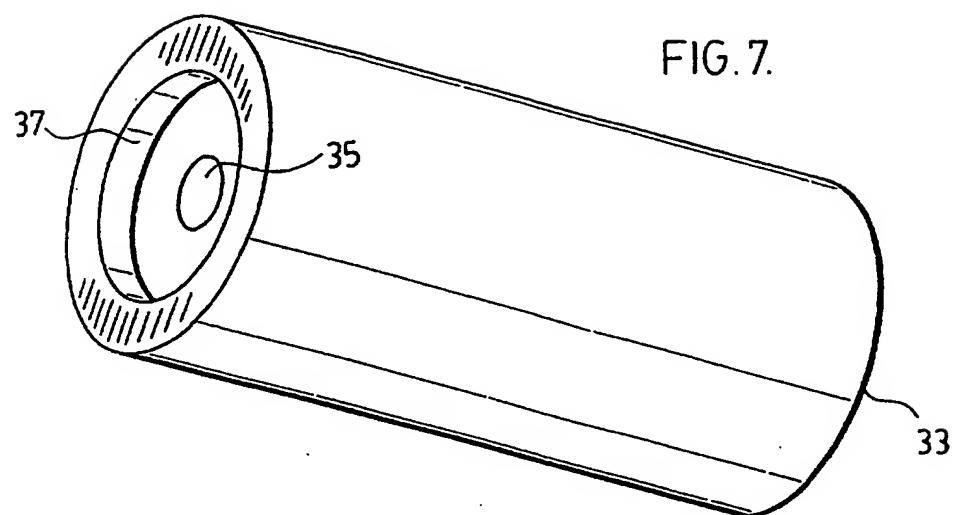
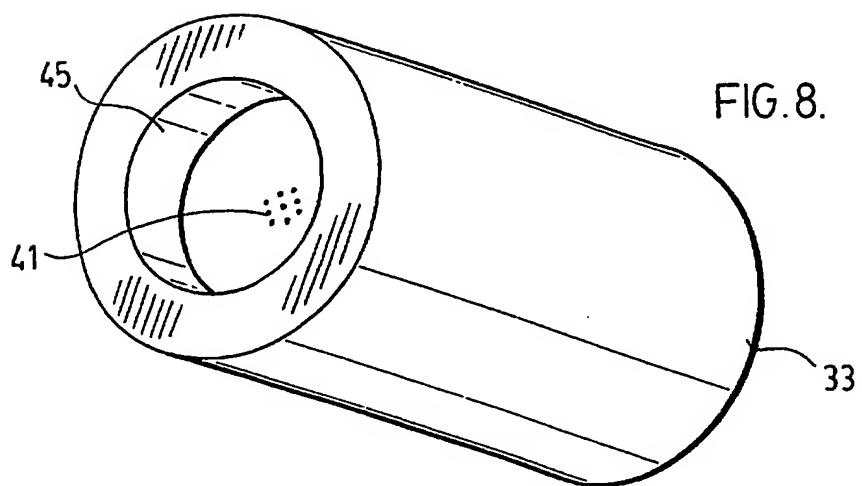


FIG. 8.



COMPLEX ACOUSTIC PATH AND GASKET  
FOR USE WITH MICROPHONES

This invention relates generally to telephone handsets, and has to do  
5 particularly with the acoustical path along which sound reaches the microphone.

BACKGROUND OF THIS INVENTION

For optimum sound reproduction, telephone handsets incorporate a  
somewhat complex acoustic path along which sound reaches the microphone, the  
10 path requiring complex geometries in the portions of the handset adjacent the  
microphone.

GENERAL DESCRIPTION OF THIS INVENTION

Generally, it is an aim of one aspect of this invention to incorporate the  
15 complex acoustic path geometry mentioned above into a simple, integral gasket,  
thus not requiring a plurality of pieces and components to have critical shapes.

More particularly, this invention provides a complex acoustic path for  
bringing sound to a microphone, the path comprising:

aperture means,  
20 a pre-plenum adapted to receive sound through said aperture means,  
an acoustic filter communicating with the pre-plenum and defining relatively  
small openings for sound to exit the pre-plenum,  
a voice tube extending away from said filter and adapted to receive sound  
from the filter, the voice tube terminating in a microphone plenum adjacent the  
25 microphone.

Furthermore, this invention provides a gasket for bringing sound from an  
aperture means to a microphone, the gasket defining a pre-plenum adapted to  
receive sound through said aperture means, an acoustic filter communicating with  
the pre-plenum and defining relatively small openings for sound to exit the pre-  
30 plenum, and a voice tube extending away from said filter and adapted to receive

sound from the filter, the voice tube terminating in a microphone plenum adjacent the microphone.

Finally, this invention provides a method of delivering sound to a microphone, comprising the steps of:

- 5     -- admitting the sound to a pre-plenum,
- passing the sound from the pre-plenum through an acoustic filter defining relatively small openings for sound to exit the pre-plenum,
- receiving the sound at one end of a voice tube communicating with and extending away from said filter,
- 10    -- passing the sound to the other end of the voice tube and there admitting the sound to a microphone plenum disposed adjacent the microphone.

#### GENERAL DESCRIPTION OF THE DRAWINGS

One embodiment of this invention is illustrated in the accompanying drawings, in which like numerals denote like parts, and in which:

- 15    Figure 1 is a sectional view through a portion of a handset, showing the prior art;
- Figure 2 is a sectional view similar to Figure 1, but showing the gasket of the present invention in axial section;
- 20    Figure 3 is an axial sectional view of the gasket of this invention, drawn to a larger scale than that of Figure 2;

Figure 4 is a perspective view of a handset, showing the positions of apertures which initiate the advantageous acoustic path provided herein;

- 25    Figure 5 is a sectional view taken through one end of a telephone handset, showing certain components in exploded relation;

Figure 6 is a partly sectional view of the end of a handset containing the gasket of this invention;

Figure 7 is a perspective view of the gasket of this invention, seen obliquely from one end; and

Figure 8 is a perspective view of the gasket of this invention, taken obliquely from the other end.

#### DETAILED DESCRIPTION OF THE DRAWINGS

5 Attention is first directed to Figure 1, which shows a sectional view through the microphone end of a typical telephone handset of the prior art, the section passing through two parallel, tubular passageways 12 which carry sound from respective openings 13 to one side of a cylindrical, solid gasket 15 which contacts the lower side of a microphone 17, the latter being sandwiched between the gasket 15 and a printed circuit board 19. As can be seen, a portion of the telephone handset defines a central tower 21 which contains the openings 12, and provides at the top a substantially cylindrical recess for receiving the gasket 15 and the microphone 17. Typically, the microphone 17 is soldered in place against the printed circuit board 19.

10 15 Attention is now directed to Figure 2, which illustrates the present invention. In Figure 2, sound first enters through two openings 23, which may be called acoustic entry holes.

15 20 Extending integrally upwardly from a portion 25, defining part of the housing for the handset, is a microphone tower 27, which defines a cylindrical internal chamber 29. At the bottom end, the chamber 29 terminates in a flat wall 31. As can be seen, the openings 23 communicate the chamber 29 with the space outside the handset.

25 Looking simultaneously at Figures 2 and 3, the gasket of the present invention will now be described. In the Figures, the numeral 33 designates the gasket. A voice tube 35 extends coaxially along the gasket 33 between a microphone plenum 37 at the top end, and an acoustic filter 39 at the bottom end. The microphone plenum 37 is disc-shaped, with a diameter greater than that of the voice tube, with which it is coaxial. The acoustic filter 39, in the embodiment illustrated, consists of a cluster of small holes 41 extending through a relatively thin 30 wall 43 separating the voice tube 35 from a pre-plenum 45.

It is therefore evident that a complex acoustic path, for bringing sound to a microphone, is provided beginning with the openings 23 which allow sound into the pre-plenum 45, the sound then traversing the acoustic filter 39 to reach the voice tube 35. The voice tube 35 terminates in the microphone plenum 37, to which it 5 delivers the sound. The microphone plenum 37 is directly adjacent the microphone 17 (see Figure 2).

It is important that the microphone 17 achieve a good seal against the gasket 33 around the microphone plenum 37, and that a similarly tight seal exist between the bottom of the gasket 33 and the bottom wall 31 (see Figure 3).

10 It is to be understood that the acoustic filter between the pre-plenum 45 and the voice tube 35 can have forms other than a cluster of small holes through a partition.

15 While one embodiment of this invention has been illustrated in the accompanying drawings and described hereinabove, it will be evident to those skilled in the art that changes and modifications may be made therein, without departing from the essence of the invention as set forth in the appended claims.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A complex acoustic path for bringing sound to a microphone, the path comprising:
  - 5 aperture means,
  - a pre-plenum adapted to receive sound through said aperture means,
  - an acoustic filter communicating with the pre-plenum and defining relatively small openings for sound to exit the pre-plenum,
- 10 a voice tube extending away from said filter and adapted to receive sound from the filter, the voice tube terminating in a microphone plenum adjacent the microphone.
2. The path claimed in claim 1, in which the pre-plenum, the filter, the voice tube and the microphone plenum are substantially in longitudinal alignment.
- 15 3. The path claimed in claim 2, in which the filter consists of a cluster of small holes extending through a relatively thin wall separating the pre-plenum from the voice tube.
- 20 4. A gasket for bringing sound from an aperture means to a microphone, the gasket defining a pre-plenum adapted to receive sound through said aperture means, an acoustic filter communicating with the pre-plenum and defining relatively small openings for sound to exit the pre-plenum, and a voice tube extending away from said filter and adapted to receive sound from the filter, the voice tube terminating in a microphone plenum adjacent the microphone.
- 25 5. The gasket claimed in claim 4, in which the pre-plenum, the filter, the voice tube and the microphone plenum are substantially in longitudinal alignment.

6. The gasket claimed in claim 5, in which the filter consists of a plurality of small holes extending through a relatively thin wall separating the pre-plenum from the voice tube, the thin wall being an integral part of the gasket.

5 7. The combination of the gasket claimed in claim 4, with a telephone handset which includes the said microphone, said aperture means being constituted by at least one opening communicating the pre-plenum with the ambience.

10 8. The combination claimed in claim 7, in which the pre-plenum, the voice tube and the microphone plenum are all substantially cylindrical and coaxial, and in which the aperture means includes two openings.

15 9. The combination claimed in claim 4, in which the handset further includes a microphone tower defining an internal cylindrical chamber adapted to snugly receive the gasket and the said microphone, the handset further including a printed circuit board disposed atop said tower, the microphone being sandwiched between the gasket and the printed circuit board.

10. A method of delivering sound to a microphone, comprising the steps of:  
20 -- admitting the sound to a pre-plenum,  
-- passing the sound from the pre-plenum through an acoustic filter defining relatively small openings for sound to exit the pre-plenum,  
-- receiving the sound at one end of a voice tube communicating with and extending away from said filter,  
25 -- passing the sound to the other end of the voice tube and there admitting the sound to a microphone plenum disposed adjacent the microphone.



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Claims searched: All

Examiner: Rowland Hunt  
Date of search: 15 November 1999

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): H4J (JBX, JEP, JK)

Int Cl (Ed.6): H04M 1/02, 1/03; H04R 1/22, 1/28, 9/08

Other: Online: WPI, EPODOC, JAPIO

**Documents considered to be relevant:**

Category	Identity of document and relevant passage		Relevant to claims
X, Y	GB 2064265 A	PYE whole doc., particularly fig. 2	1,2,10
X, Y	GB 1363550 A	IBM whole doc., particularly fig. 1a	1,2,10
X, Y	WO 98/20660 A1	ERICSSON whole doc.	1,2,10
Y	EP 0161735 A2	NTL see fig. 1 and page 1, lines 22-25	1,2,10
X, Y	US 4263484 A	AIPHONE whole doc., particularly fig. 1	1,2,10
Y	DE 4107371 A1	FERNSPRECH & SIGNALBAU see fig. 4	1,2,10

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.